

TITLE OF INVENTION

Cleaning System for Shirt Collar and Sleeves

5      **BACKGROUND OF THE INVENTION**

Dress shirts get dirty especially at the collar and the sleeve edges, and the rings around them are very stubborn to get out. The present method of cleaning them is to rely on hand brushing before putting them in a conventional washing machine. Manual brushing of clothing items with stubborn stains over several hours causes fatigue in the arms and hands. It is the object of 10 this invention to automate the brushing operation of clothing such as dress shirts to improve cleaning quality and reduce labor costs.

There are many machines for dry cleaning and laundry, but there is no special machine for cleaning the rings around the collar and sleeves of dress shirts similar to this invention.

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**BRIEF SUMMARY OF THE INVENTION**

Accordingly, it is the object of this invention to provide a cleaning system that removes stubborn stains from clothing such as the collar and sleeve edges of dress shirts before they 20 are loaded into a washing machine in a laundry. The proposed invention cleans stubborn stains by applying a rotating brush onto them with an adjustable pressure to achieve the optimal stain removal. The proposed cleaning system is comprised of a motorized wheel brush, an idle pressure roller, a pressure plate assembly, a lineup adjustment assembly and a

soup-water bowl. The operator places the ring of the collar or a sleeve edge between the wheel brush and the idle roller, and then applies a pressure onto the collar or sleeve while sliding it sideways to rub off the stains with the rotating wheel brush. The wheel brush is partially submerged at the bottom into soup water to aid cleaning process. The pressure  
5 adjustment assembly is provided to control optimal pressure for cleaning, while the lineup adjustment assembly is used to control the spacing between the wheel brush and the pressure roller. The motor and the pressuring of the idle roller can be activated with a contact or non-contact switch, a foot pedal, or other switching mechanisms.

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#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

These and other features, aspects and advantages of the present invention will become better understood with reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of the cleaning system for clothing with stubborn stain  
15 such as shirt collar and sleeves according to the present invention;

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## DETAILED DESCRIPTION OF THE INVENTION

With the reference to the accompanying drawing, the present invention will now be described.

As shown in Figures 1, the present invention is provided as a cleaning system for stubborn stains such as the rings around shirt collar and sleeves comprising a wheel brush 10 driven by

- 5 a motor 11, a soup-water bowl 60, a free-spinning pressure roller 20, a pressure transfer rod 21, a pressure plate 22, a pressure adjustment assembly 23, a linkage plate 30, a lineup adjustment assembly 31, and a foot pedal 40. All of the parts are set up on a table except the foot pedal.

- 10 The main idea of this invention is to place the heavily stained color and sleeve edges of a dress shirt onto a rotating wheel brush with an optimal pressure to get the stubborn stains out, and then wash the shirt in a washing machine. When idle, there is a gap 50 between the wheel brush 10 and the pressure roller 20 so the operator can place the shirt collar or a sleeve edge between them. The shirt collar is placed in the gap with the stained side down facing the  
15 wheel brush. The operator then steps on the foot pedal 40 which starts the motor and pulls down the pressure plate 22. The pressure plate in turn pushes down the pressure transfer rod 21 connected to the free-spinning pressure roller 20. This makes the pressure roller bear down on the collar, pressing it against the rotating wheel brush 10 getting the stain out. The pressure roller is made slightly longer than the wheel brush to keep the shirt collar in the gap  
20 more securely during cleaning. The operator then slides the collar sideways to complete the cleaning process. The release of the foot pedal stops the motor and opens up the gap between the wheel brush and the pressure roller. It is critical to control the pressure as an excessive pressure would wear away the fabric material, while an inadequate pressure would not clean

the stain out completely. To set the pressure for the optimal cleaning result, a pressure adjustment assembly 23 is provided, which consists of a mechanical spring whose strength can be adjusted by a bolt and a nut holding the spring. The linkage plate 30 and the lineup adjustment assembly 31 are provided to adjust the gap between the wheel brush and the 5 pressure roller. Finally, a bowl of soap water 60 is placed under the wheel brush so the bottom part of the wheel brush is submerged in the soap water. This arrangement distributes the soap water or similar cleaning solutions to the brush and the shirt collar without a complex mechanical system such as a spray pump. The cleaning of shirt sleeve edges is done similarly. We note that the foot pedal 40 can be replaced with a variety of switching systems including 10 contact or non-contact switches, a voice command using a voice recognition system, or a vision sensing using an inexpensive camera.

The advantage of the proposed cleaning system is the automation of the cleaning process for stubborn stains such as collars and sleeve edges of dress shirts. It can be used with any other 15 clothing as long as it can be placed in the gap between the wheel brush and the pressure roller. This system eliminates the need for manual brushing action so as to minimize the fatigue of laundry workers. This greatly increases the efficiency of the shirt cleaning process, and reduces the labor cost. Although the invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible by converting the 20 aforementioned construction. Therefore, the scope of the invention shall not be limited by the specification specified above and the appended claims.